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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

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| In the Matter of | ) | |
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| Carriage of Transmissions | ) | CS Docket 98-120 |
| Of Digital Television Broadcast | ) | |
| Stations | ) | |
| | ) | |
| Amendments to Part 76 | ) | |
| Of the Commission's Rules | ) | |

**COMMENTS OF**

**SONY ELECTRONICS INC.**

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October 13, 1998

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## Summary

Sony Electronics Inc. ("Sony" or "Sony Electronics") is a leading U.S. manufacturer of consumer electronic equipment, including television receivers. As such Sony fully supports the efforts of the Federal Communications Commission to expeditiously bring to American consumers the benefits of digital television. Sony believes that cable television carriage of broadcast DTV signals will play a central role in persuading the American viewing public to make the investment necessary for a timely transition to the new digital environment, and that the Commission should encourage and promote the carriage of terrestrial DTV signals over cable. However, Sony also believes that government regulation should be kept to the absolute minimum necessary to safeguard the public interest.

Sony agrees with the Commission that market forces, as evidenced by the ongoing collaboration between the broadcasting, cable, programming, and electronic equipment industries, will effectively deal with most of the technical issues referenced by the FCC in its *Notice of Proposed Rulemaking* ("NPRM"). The IEEE 1394 (i.LINK) digital interface, which Sony fully endorses, is a result of such collaboration. Sony believes that this interface, with content protection, will satisfactorily resolve most interface/connection issues concerning the digital set-top-box. Moreover, by enabling DTV receivers, digital cable boxes and digital audio devices to be digitally linked, the IEEE 1394 (i.LINK) interface, with copy protection, will allow the development and introduction of new digital services beyond DTV itself.

Sony believes that copy protection for digitally transmitted content will be critical to the development of DTV and related technologies. Such protection, as is provided by the "5C" Digital Transmission Content Protection (DTCP) technique proposed to the Copy Protection Technical Working Group (CPTWG) by Sony and others, is a necessary prerequisite to development of the most exciting and attractive programming for consumers. However, it is not necessary for the FCC to mandate such protection or to set the standards by which it will be provided; it will result from the operation of market forces and from the cross-industry collaboration that already is taking place.

Similarly, Sony does not believe that the FCC should require set-top-boxes to have NTSC downconversion capability or that the FCC should set DTV receiver standards. Such government involvement is, in Sony's view, unnecessary, and might well prove counterproductive by raising costs to consumers.

Sony believes that the most important factor in rapid consumer acceptance of the new DTV technology will be the assurance that, whether viewers obtain DTV signals over the air or via cable, they will receive the same high-quality picture and other value-added features (such as channel navigation, program guides, V-chip, closed captioning, and new forms of advertising and promotion). Accordingly, however the Commission ultimately defines "primary" broadcast program(s), Sony believes it is essential that cable systems pass through to the viewer all data related to the primary video program(s) originally transmitted over the air.

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**SONY ELECTRONICS INC.**

Pursuant to Sections 1.415 and 1.419 of the Commission's Rules, 47 C.F.R. §§ 1.415 & 1.419, Sony Electronics Inc. ("Sony" or "Sony Electronics") hereby submits its Comments in response to the Commission's *Notice of Proposed Rulemaking* ("NPRM") regarding cable carriage of digital television signals (FCC 98-153, released July 10, 1998).

Whether and how DTV signals will be carried on cable television systems will have an important impact on the ultimate acceptance of digital television by the American public, and on the speed of that acceptance – because most Americans today actually watch "over the air" terrestrial broadcasts via cable.

As a major U.S. television manufacturer and a leader in consumer product innovation, Sony Electronics has been intimately involved in the development of DTV technology. We have participated extensively in the ATSC proceedings and have been actively involved with many others in the development of key technologies such as IEEE 1394 (i.LINK) and digital content protection. Based on the broad range of experience and knowledge accumulated by Sony Electronics as a consequence of these efforts, we have several comments and recommendations with respect to a number of issues raised by the Commission in its NPRM.

Specifically, in these Comments, Sony Electronics addresses the impact of Sections III and IV of the NPRM on equipment manufacturers. We applaud the Commission's recognition that market forces can and will resolve technical compatibility issues and agree that it is through the operation of those market forces that the best products will be made available to American consumers.[1] Sony Electronics urges the FCC to adopt rules that encourage competition and interoperability, and to limit government regulation only to that which is absolutely necessary to protect the public interest.

## I. Overview Of Technology Development – A History Of Collaboration

In its NPRM, the Commission requests information about the current state of technology, particularly with respect to set-top-box and receiver design.[2] Implicit in the FCC's NPRM is the recognition that ongoing collaboration among various related industries is a necessary prerequisite to the successful and timely deployment of DTV transmission technology. The technical innovation that results from such collaboration benefits the public interest by making available to American viewers improved television-delivered services and by providing the basis for a broad range of potential new technologies that will touch and impact upon every element of our society.

Currently, the industries involved in DTV, both directly and indirectly, have undertaken unprecedented initiatives to work collaboratively in creating mutually compatible means of moving the process forward, always consistent with the interests of the public – whose acceptance of the offerings of DTV will become the ultimate arbiter of our success. Notable among these efforts are the work of the Consumer Electronics Manufacturers Association (CEMA), the Advanced Television Systems Committee (ATSC), the interindustry Copy Protection Technical Working Group (CPTWG) and the related Digital Transmission Content Protection effort, as well as the OpenCable initiative from CableLabs. The FCC cites some of these efforts in its NPRM, most notably the OpenCable 1394 draft specifications.[3]

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[1] NPRM, ¶¶ 1, 28.
[2] NPRM, ¶ 2.
[3] NPRM, Footnote 80.

## II. Digital Compatibility and the IEEE 1394 (i-LINK) Interface

The role of the cable industry in the establishment of DTV has become a particular focus of interest, since almost 70 percent of US households receive their television signals via cable rather than through the use of an antenna. Because of this, we believe that carriage of terrestrial DTV programming by cable operators will be a central factor in the prompt establishment and acceptance of DTV. Thus, we support the FCC's efforts to understand the compatibility issues that arise from digital transmission and cable carriage of DTV signals. On the basis of our experience, we believe that the cross-industry collaboration now in process will resolve most of the technical impediments referenced in the NPRM.[4]

Sony agrees with suggestions that the IEEE 1394 (i.LINK) digital interface will resolve digital set-top-box connection/interface issues to the satisfaction of all parties.[5] We endorse the IEEE 1394 (i.LINK) interface, with content protection, as the long-term solution to interoperability between set-top boxes and consumer DTV receivers.

We also confirm, based on our own participation in the process, that the industries involved are moving as quickly as possible to adopt and implement IEEE 1394 (i.LINK). We therefore endorse the Commission's tentative conclusion that the goal of an effective interface can be met without regulatory action.[6] As the Commission is aware, it is anticipated that the industry-led work to define and standardize relevant aspects of an IEEE 1394 (i.LINK) interface for cable, including copy protection, will be completed during fall of this year. If this goal is met, an aggressive effort to develop the necessary ICs could result in their availability mid-next year. Integration into DTV sets as well as digital cable boxes could then follow. We do not believe that there is a broad consensus on any other solution currently available, but should one come to market, its use should not be precluded by government regulation. Instead, consumers should be allowed to choose the best product.

As the Commission is also aware, CableLabs has offered a proposed solution to the interface in the interim period before IEEE 1394 (i.LINK) becomes available for incorporation into set-top-boxes and DTV receivers.[7] They have suggested that cable operators fully process DTV signals for those of their customers who require it and provide the processed signal via a component video output for use by DTV

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[4] NPRM, ¶ 17.
[5] NPRM, ¶ 28.
[6] *Id.*

receivers.[8] Sony believes this interim solution is satisfactory for the transmission of DTV programming that originates as free, over-the-air terrestrial broadcasts, including high-definition programs, without degradation in picture quality.

Because it does not incorporate content protection, this interim solution will not in itself encourage the early introduction of new programming offered on a pay-per-view or subscription basis. While this is properly the subject of business decisions among program providers and cable operators, we nevertheless anticipate that such new offerings will await the full implementation of IEEE 1394 (i.LINK) with content protection.

Sony has been an active participant in the CableLabs OpenCable process, and has been pleased to see the speed with which that organization has tackled the difficult problems surrounding the development of a standardized infrastructure for digital cable. Sony is currently participating with CableLabs in the task of defining the details of the IEEE 1394 (i.LINK) interface between OpenCable digital cable boxes and DTV receivers, as well as co-chairing CEMA's R4.8 subcommittee Working Group 1 to finalize the IEEE 1394 (i.LINK) interface specification.

As the Commission has recognized, IEEE 1394 (i.LINK) is an important technology for digital consumer audio and video devices.[9] IEEE 1394 (i.LINK) allows these devices to be digitally linked at speeds up to 400 megabits per second. While today we are primarily focused on IEEE 1394 (i.LINK) as a digital interface between digital cable boxes and HDTV sets, the future of IEEE 1394 (i.LINK) is much broader.

The ability to digitally link devices such as DTV receivers, digital cable boxes, and digital audio devices will allow the development and introduction of new digital services, such as the purchase and downloading of music or other content. However, before IEEE 1394 (i.LINK) can be used to implement these services, and before it can be used as an interface between digital cable boxes and HDTV sets, there must be a way to ensure that copyrighted material that is sent over such a digital link is protected.

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[7] NPRM, Footnote 80.
[8] *Id.*
[9] NPRM, ¶ 30.

In the case of cable, the importance of content protection has a direct bearing on the availability of attractive, exciting high-definition programs. Program producers will be understandably reluctant to release recent hit films in digital high definition unless they have reasonable assurance that their content will not be subject to unauthorized copying or duplication. Sony, along with Hitachi, Intel, Matsushita, and Toshiba developed the so-called "5C" Digital Transmission Content Protection (DTCP) technology to meet the motion picture industry's requirements in this area. We believe that this technology is the appropriate choice for protecting content over the IEEE 1394 (i.LINK) interface between OpenCable digital cable boxes and DTV receivers.

As stated above, CableLabs and CEMA working groups are making good progress in resolving the remaining outstanding issues necessary to fully define the IEEE 1394 (i.LINK) digital cable interface. Nevertheless, it is not possible to implement this interface in DTV receivers or digital cable boxes that will be shipped this fall. However, it is clearly important to make some interim provision that can allow early purchasers of HDTV sets to receive free, over-the-air, terrestrial digital broadcasts via cable systems. CableLabs has recommended the use of baseband HD component signals (Y, Pb, Pr) for this purpose. We support this recommendation.

Finally, in response to the FCC's inquiry about mandatory signal processing for set-top-boxes,[10] Sony concludes that digital cable boxes should not be required to process all DTV formats, since IEEE 1394 (i.LINK) is a viable solution that will allow for the less expensive alternative of sharing the processing resources of all parts of the digital home system. Particularly as the cable box market migrates to retail, there needs to be flexibility in offering various products that meet the needs of consumers. For this same reason, we also feel that it would be inadvisable to involve the government in setting mandatory standards for digital cable-ready receivers[11] (see related comments below).

In its NPRM, the FCC requests technical information on set-top-box compatibility.[12] In this regard, Sony submits the following additional responses:

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[10] NPRM, ¶ 29.
[11] NPRM, ¶ 31.
[12] NPRM, ¶ ¶ 25-30.

- **Cost Impact of Converting the Signal for Display on NTSC Television Receivers**[13]

Sony believes that mandatory HD to NTSC downconversion is unnecessary and would, indeed, be counterproductive. Given the vast installed base of NTSC televisions, VCRs, and related devices, we believe there is sufficient market incentive to provide NTSC signals to current television receivers to protect consumers' investment in these products without the need for additional regulation.

In addition, requiring NTSC downconversion capability could actually slow the transition by consumers to digital television by minimizing the incentive to invest in new digital TV sets.

Mandating downconversion capability in cable boxes might also increase costs for consumers wishing to purchase DTV receivers. Such a requirement would necessitate placing an HD decompression chip in each cable box. However, the use of an IEEE 1394 (i.LINK) interface between a digital cable box and a DTV set eliminates the need for HD decoding in the cable box (see our comments below on interface issues) and permits that to take place in the DTV receiver. Requiring NTSC downconversion capability, thus, might result in increased costs to consumers wishing to purchase DTV receivers by requiring them to pay for an HD chip both in the cable box and in the DTV receiver. Once again, this might create a disincentive to invest in new DTV receivers and thus slow the transition to full DTV. For these reasons, we believe that the question of downconversion capability is best addressed through the operation of the market, rather than by government regulation.

- **Receiver Standards**[14]

It is not necessary or advantageous for the Commission to promulgate DTV receiver standards. Such standards would unnecessarily stifle innovation and creativity in the design of DTV receivers and other connected devices. The unforgiving competitive market forces at work in the consumer electronics field are more than adequate to assure that DTV receiver designs meet consumer needs and expectations in an efficient and cost-effective manner.

Initial DTV receivers are designed to receive over-the-air terrestrial DTV transmissions using the 8VSB modulation that is part of the ATSC standard endorsed by the Commission. Initial DTV receivers

[13] NPRM, ¶ 27.

are unlikely to include the ability to demodulate QAM transmissions over cable, principally because these transmissions are expected to be encrypted or "scrambled". Clearly, there is little benefit in including QAM demodulation if the resulting signal is encrypted, and will be incapable of being decompressed and viewed. As the Commission is aware, it is not currently possible to include decryption circuitry in devices that are sold to consumers.

However, the Commission's recent "Navigation Devices" ruling (CS Docket 97-80, FCC 98-116) provides a solution to this dilemma, by requiring the separation of security and the provision of "security modules" by cable operators by July, 2000. Consequently, it should be possible for consumer DTV receivers to incorporate QAM demodulators, and a security interface to accept a decryption module, after that date.

Consumer DTV receivers that incorporate an IEEE 1394 (i.LINK) interface need not incorporate QAM demodulators, as that function, along with decryption, is handled by the digital cable box.

We believe that the complementary approaches of

(1) DTV sets that incorporate QAM demodulators and a cable security interface, and
(2) DTV sets and digital cable boxes that incorporate an IEEE 1394 (i.LINK) interface

will successfully address compatibility issues for digital cable, and will substantially accelerate consumer adoption of DTV.

**III. Best Picture Quality, Not Specific Equipment, Will Bring Most Rapid Consumer Acceptance**

We believe that the rapid acceptance of DTV in the American marketplace depends, not only on the availability of terrestrial DTV programming via cable, but also on ensuring that the full measure of DTV's superiority over NTSC television actually reaches even early purchasers of DTV receivers. Such consumers, whose interest in DTV technology will be evidenced by their willingness to invest in first-generation DTV receivers, can be expected to be forceful advocates for the new technology – provided that they are exposed to the full range of its advantages over analog transmission. Some television

[14] NPRM, ¶ 31

manufacturers have announced product strategies based on incorporating the highest possible level of performance – HD display – in their initial offerings this fall. We believe both the long-term IEEE 1394 (i.LINK) solution and the interim component video solution proposed by CableLabs provide the technical means for delivering on this promise – including high-definition television.

Sony believes that HDTV will be a significant driving force in the ultimate acceptance of DTV, and that it is important that the full quality of the programs that broadcasters choose to transmit in high definition is available to all consumers who purchase HDTV sets, regardless of whether they receive their signal over the air, through a cable system, or by some other means. In the interest of rapid acceptance of DTV, with its consequent benefits to consumers and industries alike, and in the absence of limiting technical considerations, we urge the Commission to adopt a requirement that, insofar as cable operators carry DTV broadcast programming, these programs be provided to the consumer at their original level of quality.

## IV. Carriage, Retransmission and Copyright Protection

As we noted above, cable carriage of broadcast DTV signals will play a central role in the speed with which this new technology is accepted and utilized by American consumers. Sony urges the Commission to encourage and promote cable carriage of terrestrial DTV signals. Nevertheless, we do not feel that it is appropriate for Sony Electronics to comment on the specific "must carry" options presented by the Commission.[15] In Sony's view, that issue is best addressed by cable operators and broadcasters, as well as by representatives of the viewing public, rather than by electronic equipment manufacturers such as Sony. We do, however, offer the following specific comments on other aspects of the carriage issue:

- **Primary Video and Ancillary and Supplementary Services**[16]

However the "primary" broadcast program or programs are defined, it is essential that cable systems pass through to the user all data related to the primary video program(s) as originally transmitted over the air. The digital television system can incorporate data that enable such capabilities as channel navigation, program guides, V-Chip, and closed-captioning operation. Data can also be incorporated that enable new

[15] NPRM, ¶¶41-51.

forms of advertising and promotion, such as in-home printing of promotional materials on behalf of advertisers. Insofar as these or similar data enable functionality or provide a basis for the advertising revenue that makes possible the delivery of programming to consumers, they should be considered program-related and must be transmitted to consumers by the cable operator if the program falls within the definition of "primary" as adopted by this proceeding. Failing this, functionality and/or programming available to the consumer may be seriously compromised and the full capabilities of DTV not realized.

Related to this point is the standard by which program system information is incorporated into the digital data stream by both broadcasters and cable operators. It is essential that digital television receivers detect and decode such information as regional rating tables if they are to function reliably in regard to channel navigation and other requirements. While we believe that market forces will dictate from the outset that television manufacturers incorporate the ATSC PSIP Standard A-65 into receivers, both receiver designers and consumers require a reliable expectation that such data will also be broadcast and passed through cable systems in compliance with the same standard. For this reason, we urge that ATSC A-65 be made the required standard for PSIP carriage.

- **A/B Switches**[17]

Sony does not believe that A/B switches represent a real consumer solution to the complex issues of the carriage of terrestrial DTV signals over cable. Although some consumer sets, including Sony's, include provisions for attaching more than one cable or antenna, the real issue is not A/B switches, but rather antennas. As the Commission observes in its NPRM, most consumers who subscribe to cable do not maintain terrestrial antennas. Many consumers who subscribe to cable are in areas where antennas are either ineffective or impractical. Providing A/B switching cannot provide access to DTV signals when the antenna itself is not present or not usable.

- **Cable Boxes**

Another key issue affecting the speed of consumer adoption of DTV, will be the ability of consumers to purchase DTV cable boxes. The faster this happens, the faster the existing analog spectrum will be

[16] NPRM, ¶ 71-72.

returned, and the less problematical the transition period will be. The Commission's recent ruling on "Navigation Devices" (CS Docket 97-80, FCC 98-116), requiring the development of a security interface and the provision of security modules by cable operators by July, 2000, was a major positive step in speeding the adoption of DTV by ensuring that consumers will be able to purchase DTV receivers and digital cable boxes that will operate on the nation's cable systems.

- **Content Protection**

As we noted above, content protection is an important issue in assuring that the most exciting and attractive programming is made available to consumers. However, Sony Electronics does not believe it is necessary for the Commission to intervene in this area. Instead, we believe that the positive results that have been achieved thus far offer an excellent example of interindustry collaboration.

In order to ensure the protection of the program content, the motion picture and CE industries have spent years developing technical methods of protecting digital content in the Copy Protection Technical Working Group (CPTWG). This work is represented by the "5C" Digital Transmission Content Protection (DTCP) technique proposed to the CPTWG by Hitachi, Intel, Matsushita, Sony and Toshiba. Recently a licensing authority has been set up by the "5C" companies to administer "5C" Digital Transmission Content Protection technology, in a manner that assures consistent implementation, and meets content owners requirements. More information is available from the Digital Transmission Licensing Administrator, which maintains a web site at http://www.dtcp.com. To quote the DTLA,

> *To allow for protected transmission of copy-protected material between digital devices like PC's, DVD Players, and Digital TV's, five companies – Hitachi, Intel, Matsushita (MEI), Sony and Toshiba have prepared the Digital Transmission Content Protection (DTCP) specification.*
>
> *The DTCP specification defines a cryptographic protocol for protecting audio/video entertainment content from illegal copying, intercepting and tampering as it traverses high performance digital buses, such as the IEEE 1394 standard. Only legitimate entertainment content delivered to a source device via another approved copy protection system (such as the DVD Content Scrambling System) will be protected by this copy protection system.*

[17] NPRM, ¶ 88.

*The DTCP specification relies on strong cryptographic technologies to provide flexible and robust copy protection across digital buses. These cryptographic techniques have evolved over the past 20 years to serve critical military, governmental and commercial applications.*

*These techniques have been thoroughly evaluated by hackers and by legitimate cryptographic experts and have proven their ability to withstand attack. The cryptographic stability of the system is derived from the proven strength of the underlying technologies, rather than merely how well a certain algorithm can be kept secret.*[18]

## V. Conclusion

The carriage of digital television programming by cable systems is essential to the swift establishment and acceptance of DTV in the United States. In order to speed the transition from analog to digital television, therefore, the Commission should encourage and promote cable carriage of terrestrial digital programming.

Unprecedented interindustry collaborations are quickly producing solutions to both short- and long-term interoperability between cable and consumer television receivers. These include interface standards and content-protection systems, primary among which are the IEEE 1394 (i.LINK) digital interface and the CPTWG work to identify an encryption system acceptable to the US entertainment industry – an essential prerequisite to the availability of high-value programming. The schedule on which these solutions are finalized is largely dictated by the technical obstacles to be overcome and would therefore not be materially aided by government regulation. To the contrary, unwarranted government intervention might well complicate those efforts.

For full functionality to be realized in the operation of DTV receivers, it is essential that all program-related data be transmitted intact, in a form that receivers can reliably be designed to accommodate. Since such reliability is essential to consumer acceptance of DTV, the Commission could help by taking steps to ensure complete and intact transmission of all data related to a primary program.

[18] DTLA Home Page (http://www.dtcp.com).

Finally, the performance quality of digital television will constitute a major market force, leading to timely consumer acceptance of this new technology. Therefore, we urge that the Commission adopt a requirement that, insofar as cable operators carry broadcast DTV programming, these programs be provided to the consumer at their original level of quality, in the absence of limiting technical considerations.

Respectfully submitted,

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Attachment A

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